JVC

INSTRUCTION BOOK

INTEGRATED AMPLIFIER

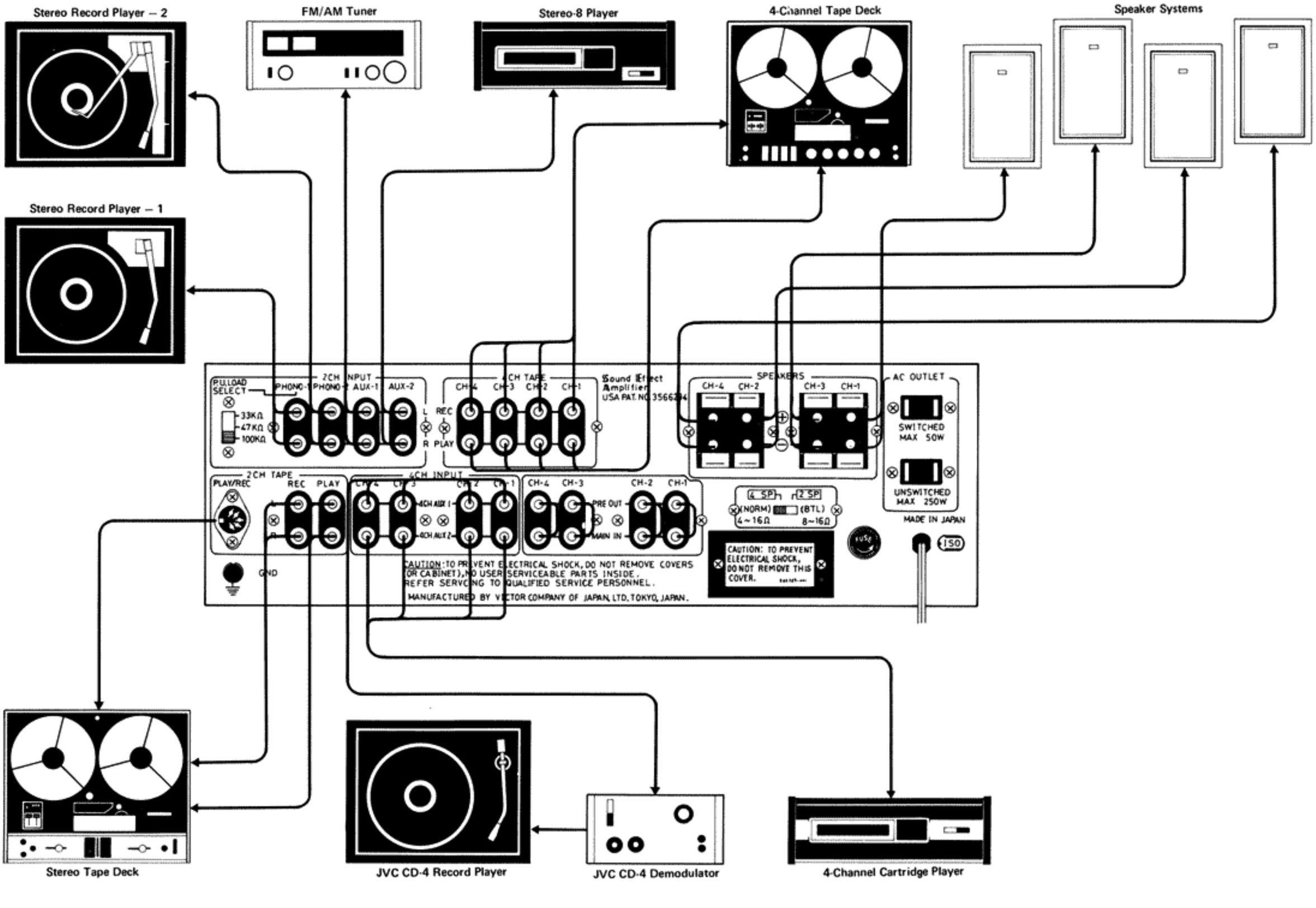
MODEL 4VN-990

CAUTIONS

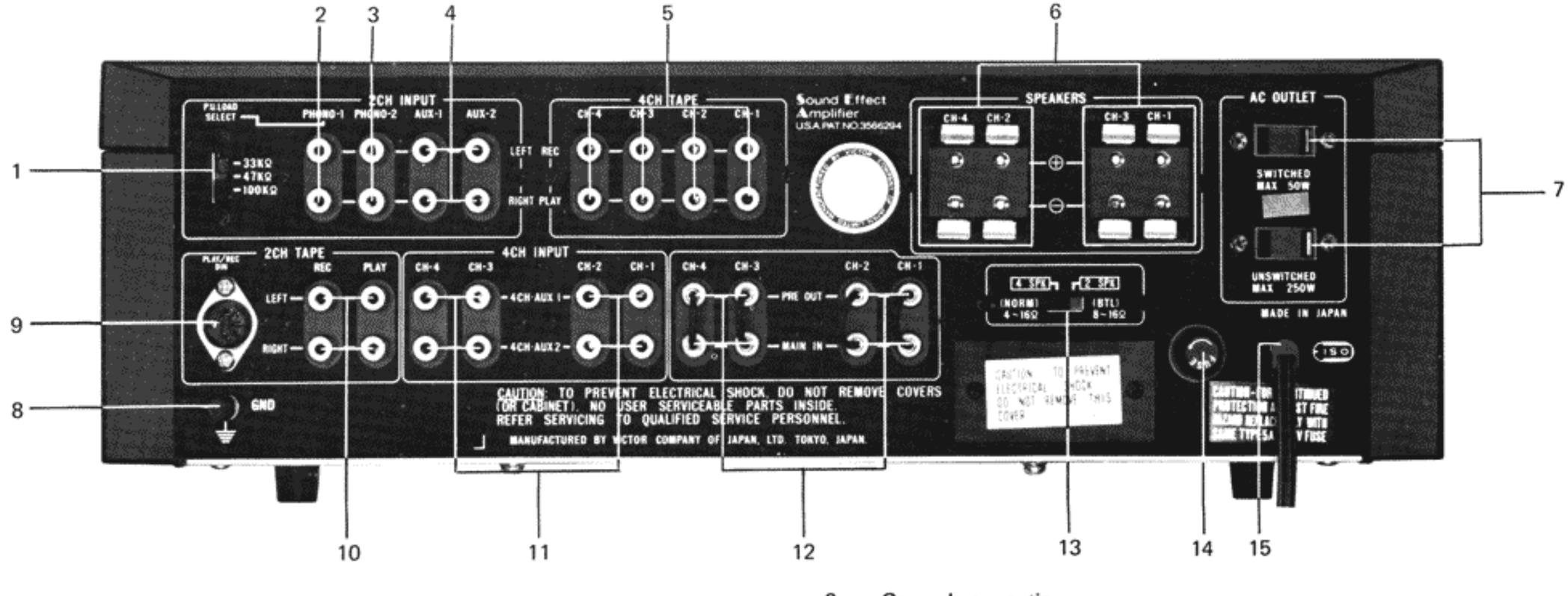
- This unit should be operated at the stated power. If the voltage exceeds that stated by more than 10% it will damage the expensive components.
- The 4VN-990 must be operated in conditions where ambient temperature is less than 95° F and relative humidity is less than 90%.
- Heat will be generated if the 4VN-990 is used at more than 10 watts of continuous power for more than 1 hour, so leave room for air to circulate in BTL 2-channel use.
- Turn off the power before connecting any components as the click noise could damage the speakers.
- Connect the speaker and input terminals correctly as wrong polarity or shorting will result in unstable sound or continuous activation of a protective circuit. A poor ground contact may result in hum which may damage the speakers.
- After turning the power switch ON or OFF wait for 7 or 8 seconds before adjusting the controls to avoid impact noise.
- Use speakers with an impedance of 4Ω or higher. If the impedance is lower than 4Ω the protective circuit will be activated and the sound will be intermittent.
- When the speaker sound is intermittent or ceases because of the activation of a protective circuit, turn off the power and investigate.
- Never touch any of the mechanical or electronic parts inside the cabinet.
- The capacity of the power cord is 500 watts. The total power supplied from the AC outlets of the 4VN-990 to external equipment should be less than 300 watts.
- When the power switch is turned ON and OFF repeatedly speaker sound may be interrupted. This is normal and is not due to any defect.
- Take care with the AC plug. Do not bend the cord perpendicularly to the plug, grasp the plug when pulling it from the AC outlet and don't apply any force to the cord.

CONTENTS

CONNECTION DIAGRAM



REAR PANEL CONNECTIONS



1 **Pick up load selector**
Selects the correct input impedance to match the Pick up which you are using on record player connected to the PHONO 1 jacks. The values which can be selected are 33kΩ, 47kΩ, 100kΩ.

2 **PHONO 1 jacks**
For the connection of a conventional 2-channel stereo record player. Input impedance is selectable.

3 **PHONO 2 jacks**
For the connection of a second record player. The input impedance is preset at 47kΩ.

4 **AUX 1 and AUX 2 jacks**
For the connection of 2-channel program sources, tuners, etc.

5 **4-Channel tape jacks**
For the connection of a 4-channel tape recorder for recording and playback.

6 **Speaker terminals**
See the section "Speaker Connection".

7 **AC Outlets**
Power for other components of your stereo system is available from these sockets. See "Supplementary Information".

8 **Ground connection**
This is a one-touch terminal for the connection of the record player's ground.

9 **DIN Socket**
This connection can be used for the connection of a tape recorder for recording and playback if the tape recorder is equipped with a DIN socket. If this connection is used connection 10 should not be used.

10 **2CH TAPE jacks**
For the connection of a 2-channel tape recorder not equipped with a DIN jack.

11 **4CH INPUT jacks**
For the connection of a 4-channel disc demodulator and another 4-channel source.

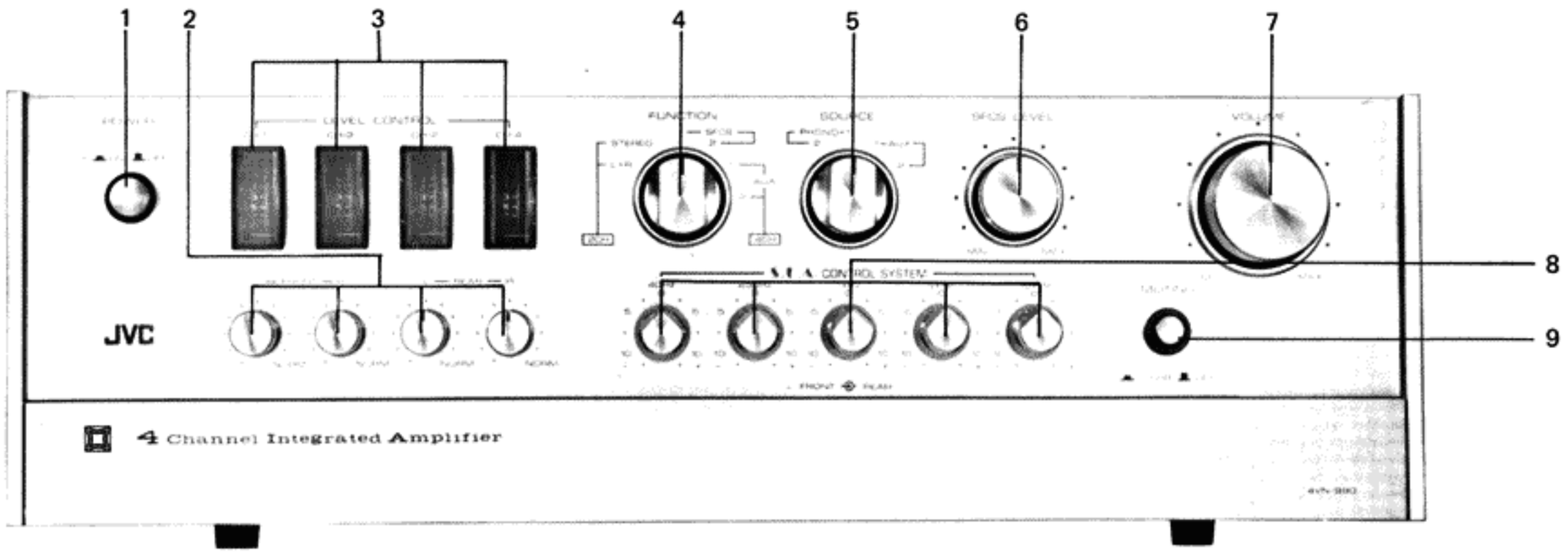
12 **PRE OUT MAIN IN terminals**
These pin jacks connect the four pre amplifiers to the four main amplifiers.

13 **B.T.L. switch**
Use this when you want double power from the front speakers. See "B.T.L. Connection"

14 **Fuse holder**
For a 5 amp fuse. See "Supplementary Information".

15 **Power cord**
For connection to AC wall outlet.

FRONT PANEL CONTROLS (UPPER)



1 Power switch
The power is on and the level indicators glow when this switch is in its ON position.

2 4-Channel level controls
For the independent control of the output levels of each of the 4 channels. These are used to achieve the required 4-channel balance.

3 4-Channel level meters
These show the output level of each of the 4 channels. They are used in 4-channel balance and indicate the output power.

4 Function selector
This is to select the function of the amplifier.

L + R : Composes the left and right stereo signals to give monaural sound. This is useful in balancing.
STEREO : To play conventional 2-channel.
SFCS 1 : To compose a four channel effect from a 2-channel source.
SFCS 2 : To play matrix 4-channel records.
AUX 1 : To play discrete 4-channel sources connected to 4CH AUX 1 jacks.
AUX 2 : To play discrete 4-channel sources connected to 4CH AUX 2 jacks.

5 Source selector
To select a 2-channel source.

PHONO 1: If you are playing from a record player connected to the PHONO 1 jacks.
PHONO 2: If you are playing from a record player connected to the PHONO 2 jacks.
AUX 1 : If you are playing from a source connected to the AUX 1 jacks.
AUX 2 : If you are playing from a source connected to the AUX 2 jacks.

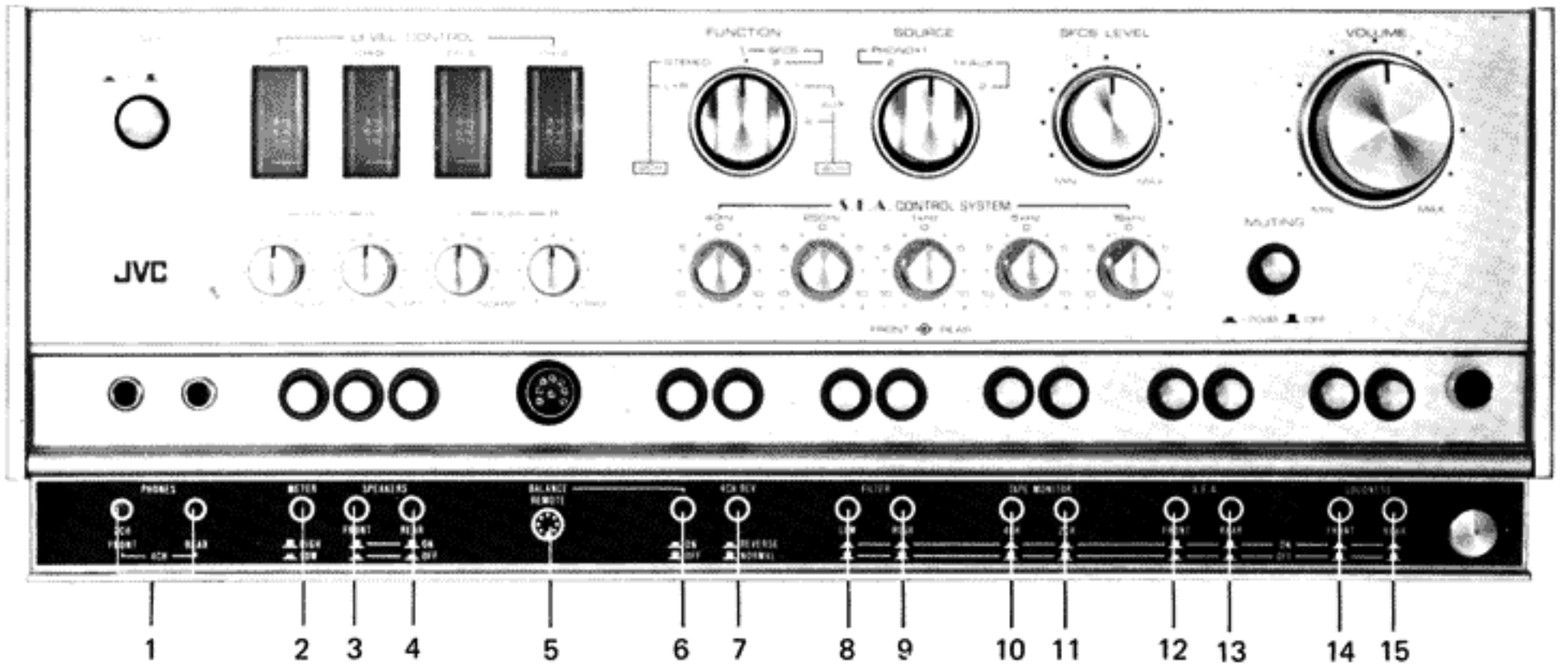
6 SFCS Level control
This knob controls the volume of the rear speakers when the Function selector is in SFCS 1 or SFCS 2 position.

7 Master volume
A knob with click positions which controls the volume of all 4 channels simultaneously.

8 S.E.A. controls
Five knobs with click positions which give you more accurate control over tone than was ever before possible. The inner knobs control the front speaker response, the outer the rear speaker response. See the section "S.E.A.".

9 Muting button
If this is pressed to its IN position the sound level is immediately reduced by 20dB. This is very useful when you have to answer the telephone. Pressing it again sets it to its OUT position and restores the sound to its original value.

FRONT PANEL CONTROLS (LOWER)



1 Headphone jacks
To connect 4-channel headphones for monitoring or private listening.
2CH/FRONT: Channels 1 & 3
REAR : Channels 2 & 4

2 Meter Sensitivity switch
To change the sensitivity of the level meters. The meters have high sensitivity when the button is OUT and low sensitivity when the button is IN.

3 Front Speaker switch
When this button is IN the front speakers are switched OFF.

4 Rear Speaker switch
When this button is IN the rear speakers are switched OFF.

5 Balance Remote Control socket
For the connection of a Balance Remote Control. See "Level Control"

6 Balance Remote Control switch
Switches balance remote control ON and OFF. When the button is IN the Balance Remote Control is ON.

7 4-Channel Reverse switch
Switches the channels through 180° when it is IN. The front left channel comes from the rear right speaker.

8 Low Cut Filter switch
When this button is IN the low cut filter is activated. This reduces sound below the audible range.

9 High Cut Filter switch
When this button is IN the high cut filter is activated. This reduces sound above the audible range.

10 4-Channel tape monitor
When you are playing from a tape recorder connected to the 4-CH TAPE terminals this button should be IN.

11 2-Channel tape monitor
When you are playing from a tape recorder connected to the 2-CH TAPE terminals or the DIN socket this button should be IN.

12 Front Speaker S.E.A. Defeat switch
If you want to hear the front speakers without the S.E.A. effect this switch should be IN.

13 Rear Speaker S.E.A. Defeat switch
If you want to hear the rear speakers without the S.E.A. effect this switch should be IN. These two controls let you compare the sound with and without S.E.A.

14 Front Speaker Loudness switch

15 Rear Speaker Loudness switch
These two switches control the loudness circuits which adjust the tone at low volumes. See "Loudness".

OPERATION CHART

SOURCE	INPUT TERMINALS	FUNCTION SWITCH	SOURCE SWITCH	TAPE MONITOR	REMARKS
2-channel records	PHONO-1 or PHONO-2	SFCS-1 or SFCS-2	PHONO-1 or PHONO-2	OFF	Simulated 4-channel system, use four speakers.
		2CH STEREO	PHONO-1 or PHONO-2	OFF	Conventional 2-channel stereo, use 2 speakers.
		2CH L + R	PHONO-1 or PHONO-2	OFF	Monaural sound will be heard from 2 speakers.
2-channel tape (open reel, 8-track or cassette)	2CH TAPE	SFCS-1 or SFCS-2	any position	2CH ON	Simulated 4-channel system, use four speakers.
		2CH STEREO	any position	2CH ON	Conventional 2-channel stereo, use 2 speakers.
		2CH L + R	any position	2CH ON	Monaural sound will be heard from 2 speakers.
Other 2-channel source	AUX-1 or AUX-2	SFCS-1 or SFCS-2	AUX-1 or AUX-2	OFF	Simulated 4-channel system, use four speakers.
		2CH STEREO	AUX-1 or AUX-2	OFF	Conventional 2-channel stereo, use 2 speakers.
		2CH L + R	AUX-1 or AUX-2	OFF	Monaural sound will be heard from 2 speakers.
4-channel records	4CH AUX-1 or AUX-2	AUX-1 or AUX-2	any position	OFF	A CD-4 demodulator will be necessary. Use 4 speakers.
4-channel tapes open reel or 8-track	4CH TAPE	any position	any position	4CH ON	A 4-channel tape deck is necessary. Use 4 speakers.
Other 4-channel sources (decoder for FM 4-channel broadcasts)	4CH AUX-1 or AUX-2	AUX-1 or AUX-2	any position	OFF	Use 4 speakers.

SPEAKER CONNECTIONS

The speakers should be connected in the correct position:

Front Left	CH 1
Rear Left	CH 2
Front Right	CH 3
Rear Right	CH 4

They are one-touch terminals. To connect the speaker cords bare about 1/4" of the end of a cord, press the rectangular button, insert the end of the cord into the terminal and release the button.
The cord will be firmly held in place and make perfect electrical contact. Be careful to connect the cords correctly + to + and − to −. Reversed polarity will cause the quality of the stereo sound to deteriorate.

OPERATION - DISCRETE 4-CHANNEL

Connection
Three 4-channel components can be connected to this amplifier. In many cases this will be a reel-to-reel tape recorder for recording and playback, a CD-4 discrete 4-channel record player/demodulator and a 4-channel, 8 track cartridge player. The tape recorder should be connected to the 4CH TAPE terminals. The 4VN-990's REC terminals should be connected to the REC or LINE IN terminals of the tape recorder and the PLAY terminals to the tape recorder's LINE OUT terminals.
The 4-channel program sources should be connected to the 4CH INPUT terminals. For all these connections be careful to connect CH 1 to CH 1, etc.

Playback
If the program source is connected to the 4CH INPUT terminals select the correct position of the Function Selector. If the program source is connected to the 4CH TAPE terminals press IN the 4-Channel Tape Monitor button.
Play the source according to the manufacturer's instructions. Adjust the volume with the Master Volume Control, the balance with the Balance Remote Control or 4 channel level controls and the tone with the S.E.A. controls.

Recording
With the Function Selector select the 4-channel source.
The 4-Channel Tape Monitor button should be OUT.
Play the source and tape recorder according to manufacturer's instructions.

OPERATION - 2-CHANNEL

Connection
If the source is connected to the PHONO 1, PHONO 2, AUX 1 or AUX 2 jacks the corresponding position must be selected with the Source Selector. If the source is a tape recorder connected to the DIN socket or the 2CH TAPE jacks the 2-channel Tape Monitor button should be IN.

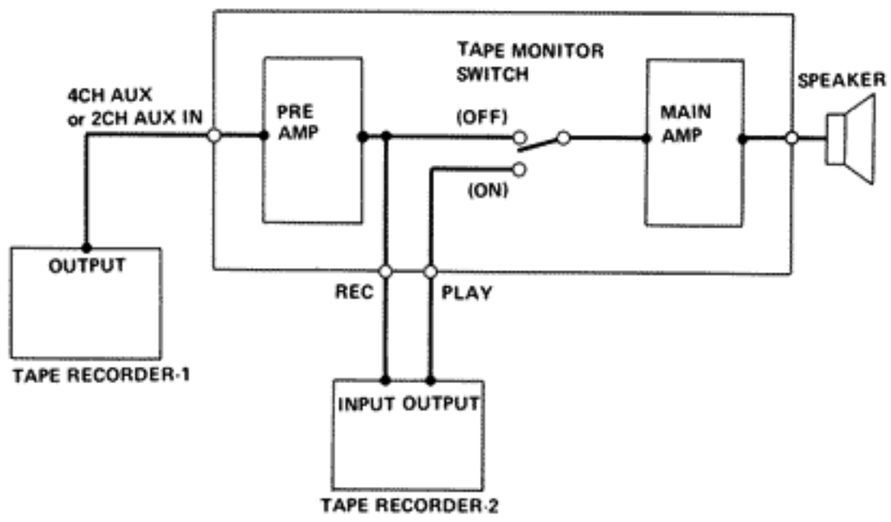
Conventional 2-channel stereo
Set the Function Selector to STEREO.
If you want to hear stereo out of the front speakers only, push in the Rear Speaker switch (Front panel, lower, 4). Play the source acoording to manufacturer's instructions. Adjust the volume, balance and tone.

Conventional 2-channel stereo with double power
Set the function selector to STEREO.
Set the B.T.L. switch to 2SP.
Play the source according to manufacturer's instructions.
Adjust the volume, balance and tone.

Conventional 2-channel source with added 4-channel effect
Set the Function Selector to SFCS 1.
Play the source according to manufacturer's instructions.
Adjust the volume, balance and tone.
The SFCS Level control will control the volume of the rear speakers.

Recording
With the Source Selector select the 2-channel source.
The 2-Channel Tape Monitor button should be OUT.
Play the source and tape recorder according to the manufacturer's instructions.

Tape Dubbing



How It Compensates for Components

Nearly all moving magnet phono cartridges on the market have resonance peaks between 10,000 and 15,000Hz which cause harsh, gravel-like noise to be played back in the high frequency ranges. By utilizing the SEA system's high frequency controls, this annoyance is greatly reduced and the sound is heard more naturally.

Because of recording techniques, phonograph records from different recording companies differ in sounds that can be reproduced. The SEA system enables the user to match the sounds of one record to that of another.

In most small bookshelf speaker systems, the lows as a rule are unduly attenuated under 200Hz. The SEA system allows these lows to be easily reproduced by correcting the low frequency characteristics of the speaker system.

On many vocal recordings, the phenomena of voice fading and being masked by instruments occur. The voice can easily be drawn out by emphasizing the 1,000 and 5,000 Hz controls of the SEA system. Ordinary tone controls cannot do this.

How It Can Create New Sounds

Most stereo systems have a turntable or record changer and some kind of taping device as program source components. By utilizing these components with the SEA system, the sounds from the record can be mixed or altered and re-recorded in an altogether new form.

How It Compensates For Room Acoustics

Even when using the same stereo equipment, tone characteristics change when the equipment is moved to different acoustic environments such as large rooms, small ones, heavily furnished or sparsely furnished rooms. The SEA system allows practically every kind of room to be turned into an ideal listening environment. In the average size room, a harmful standing wave occurs in the 100 to 300 Hz range which causes sound to become blurred and sound intensity to rise.

This is quickly eliminated by utilizing the proper SEA system controls.

Listening Environment

In small rooms, the high end response is generally emphasized. Whenever the frequency is too high howling occurs, a particularly annoying type of noise to most listeners. This is also quickly adjusted by using the proper SEA system controls.

Low end response is generally emphasized in large rooms or halls. If it becomes too exaggerated, it can be corrected quite simply by the SEA system.

Distortion of the medium to high tones often occurs in rooms with a lot of sound-absorbent materials, such as drapes, carpets, stuffed furniture, etc.

Again, this can be swiftly corrected by utilizing the SEA system.

THIS IS WHAT S.E.A. CAN DO

40Hz

Cut to eliminate hum or rumble. Boost to emphasize lowest bass at low volume levels.

250Hz

Cut to reduce speaker boom. Boost to add clarity to upper bass sound.

1000Hz

Most effective in emphasizing voices.

5000Hz

Effects upper mid-range. Gives greater power and clarity to brass and string.

15000Hz

Cut to eliminate scratch and hiss. Boost to retain good level of highs in low volume playback.

The S.E.A. built-in to this amplifier gives you control over the tone of the front and rear speakers separately. The inner knob controls the front response and the outer the rear response. A further sophistication is the provision of Front and Rear S.E.A. defeat switches. When these are used the effect of S.E.A. is immediately cancelled and the sound goes back to a flat response throughout the frequency range.

By switching S.E.A. off you can see how the character of the sound is changed using this tone control system.

S.F.C.S.

Two S.F.C.S. systems are built into this amplifier; SFCS 1 which is a JVC original and SFCS 2 which decodes any standard of matrix 4-channel source.

When the Function Selector is switched to SFCS 1 and a conventional 2-channel stereo source is input a convincing 4-channel effect will be heard from the speakers.

It does this by a very ingenious method. Each track of a stereo recording contains to a lesser or greater extent, as well as the sound directly from the source, a component of sound which is reflected from the rear wall of the auditorium. This sound has a different phase from the direct sound, so a phase separation circuit can split these two components and use the reflected component to drive the rear speakers.

Many record manufacturers are now producing matrix 4-channel records. These differ from conventional 2-channel records in that each track contains information about the sound that should come out of more than one speaker. By the addition and subtraction of the signals on the two tracks the four signals necessary for 4-channel sound can be calculated. This is done in a matrix circuit. SFCS 2 switches in a circuit which can decode any matrix 4-channel system.

These two facilities make the 4VN-990 a powerful amplifier which will produce a 4-channel effect from any standard of 2-channel or matrix 4-channel source.

LEVEL CONTROL

4-Channel balance can be controlled from the four level controls on the front panel.
With the addition of the Balance Remote Control (JVC model number 5910) plugged into the Remote Balance Control Socket on the front panel, 4-channel balance can be controlled from your listening position (where it really matters) with one easy-to-use control. When the Balance Remote Control is being used the level controls should all be set to their 12 o'clock positions. When it is not plugged in the cap should be in place or the amplifier will not work.
The 4VN-990 4-channel Remote Balance is fitted with a defeat switch so that the effect of the Balance Remote Control can be eliminated allowing you to hear the difference that its use makes to the sound field.

LOW CUT/HIGH CUT FILTERS

Two filters are provided to eliminate low and high frequency sounds near the limits of the human ear.
When the low cut filter is used it decreases sounds below 50Hz by 3dB and 12dB/octave. This can be used to reduce low frequencies interferences such as motor rumble.
The high cut filter lowers the level of sounds above 7kHz by the same amount. It can be used to decrease the amount of annoying high frequency noise.

LOUDNESS CONTROLS

The human ear is not a perfect receiver of sound. At low volumes its sensitivity to high and low frequency sounds decreases. This means that, if you leave the settings of the S.E.A. tone control system the same and decrease the volume, at low volumes the tonal quality will appear to change. This is due to the different sensitivity of the ear. The loudness controls compensate for this by boosting the levels of low and high frequency sounds by small and carefully calculated amounts. Two controls are provided, one for the front speakers and one for the rear speakers.

B.T.L. CONNECTION

When the amplifiers of the 4VN-990 are rearranged by means of the BTL connection (Balanced Transformerless) they deliver twice the power to two speakers as they do to four.
All you have to do is switch the BTL switch on the rear panel from 4 SP to 2 SP.
The four discrete preamplifiers and main amplifiers are connected by pin jacks and if they are removed the 4VN-990 will no longer function as an integrated amplifier. They can be removed to use the amplifier as a component in a multi channel system.

SUPPLEMENTARY INFORMATION

AC Outlet
The AC outlets on the rear panel can be used to supply power to other components of your stereo system.

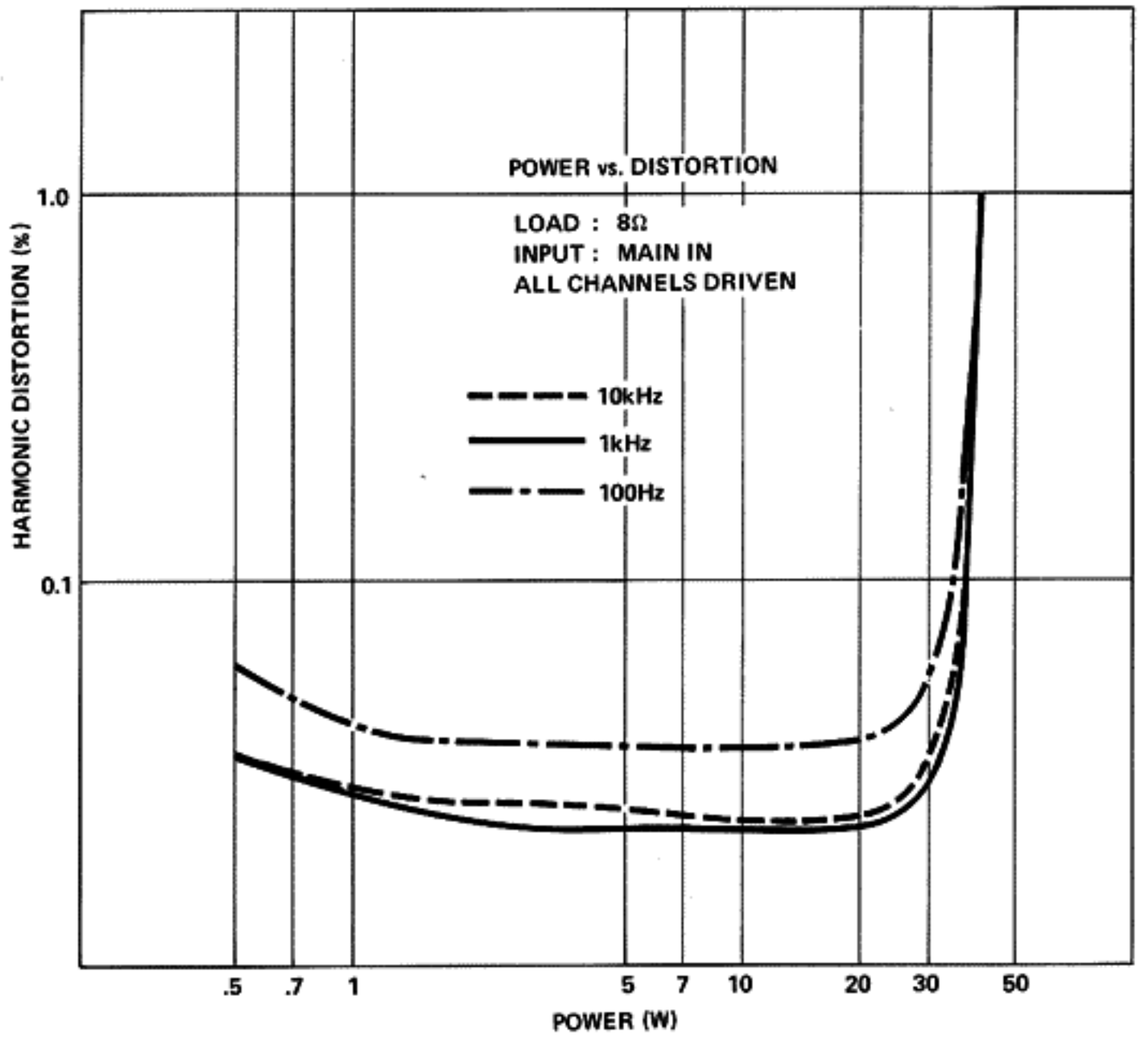
1. (Upper) 50 Watt switched outlet
   This outlet is switched off when the amplifier is switched off.
   Do not connect any equipment which requires more than 50 watts to this outlet.
2. (Lower) 250 Watt unswitched outlet
   This outlet does not switch off when the amplifier is switched off.
   Do not connect any equipment which requires more than 250 watts to this outlet.

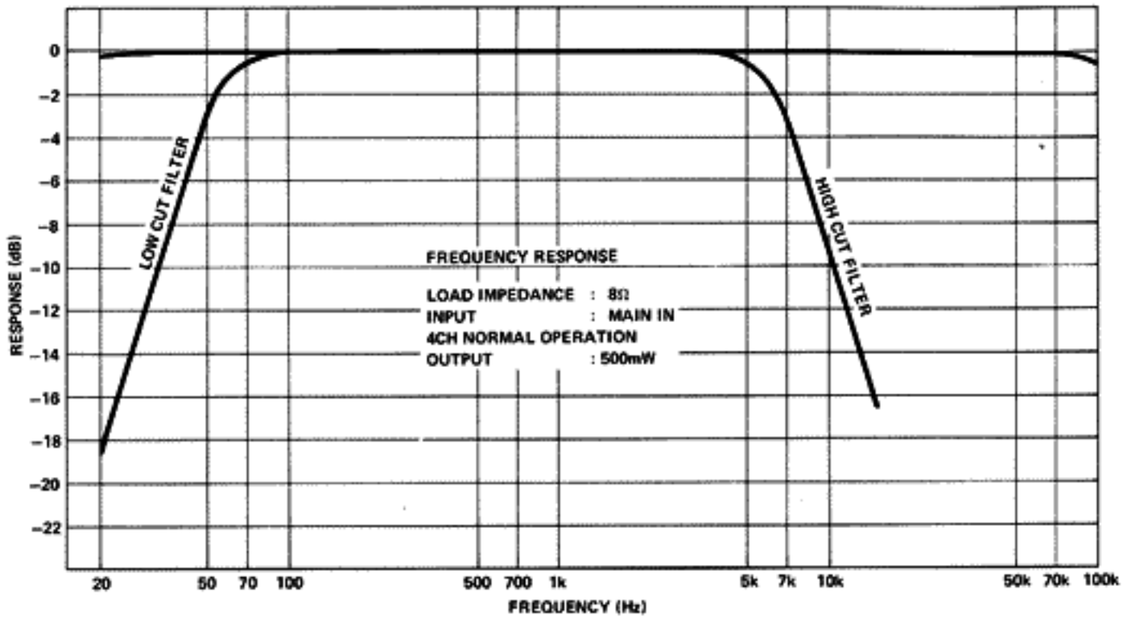
Protective Circuit (US PATENT NO. 3691427)
This amplifier has the most sophisticated protective circuits developed built into it. With normal OCL (Output Capacitorless) circuits there is nothing to protect the speakers from overload.
This unit has a newly developed circuit to protect the speakers in this case. Also circuits protect transistors from electrical overload. When a protective circuit is activated the program will be heard intermittently. This is not the result of any damage but the operation of the protective circuitry. Switch the amplifier OFF and inspect the connections on the rear panel.

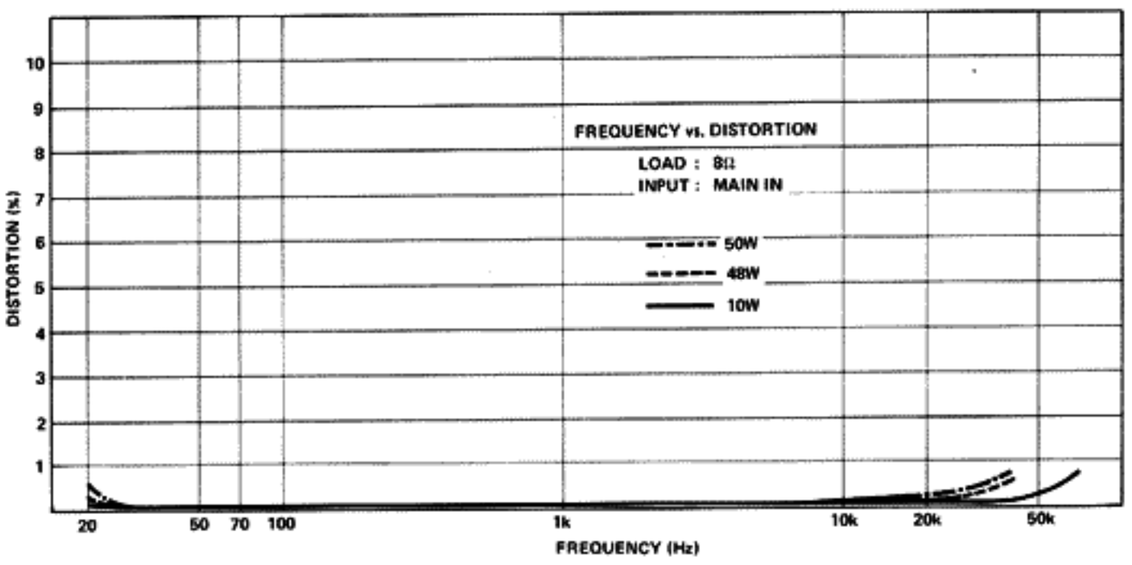
Fuse
A 5 amp fuse is used. If the fuse should fail for any reason turn the fuse holder in the direction of the arrow; remove and replace the fuse. Always check the reason for the blowout before replacing the fuse. If there is something wrong with your supply circuit the fuse will blow again.
If you think there is something wrong with the supply circuit it is advisable to consult a qualified electrician.

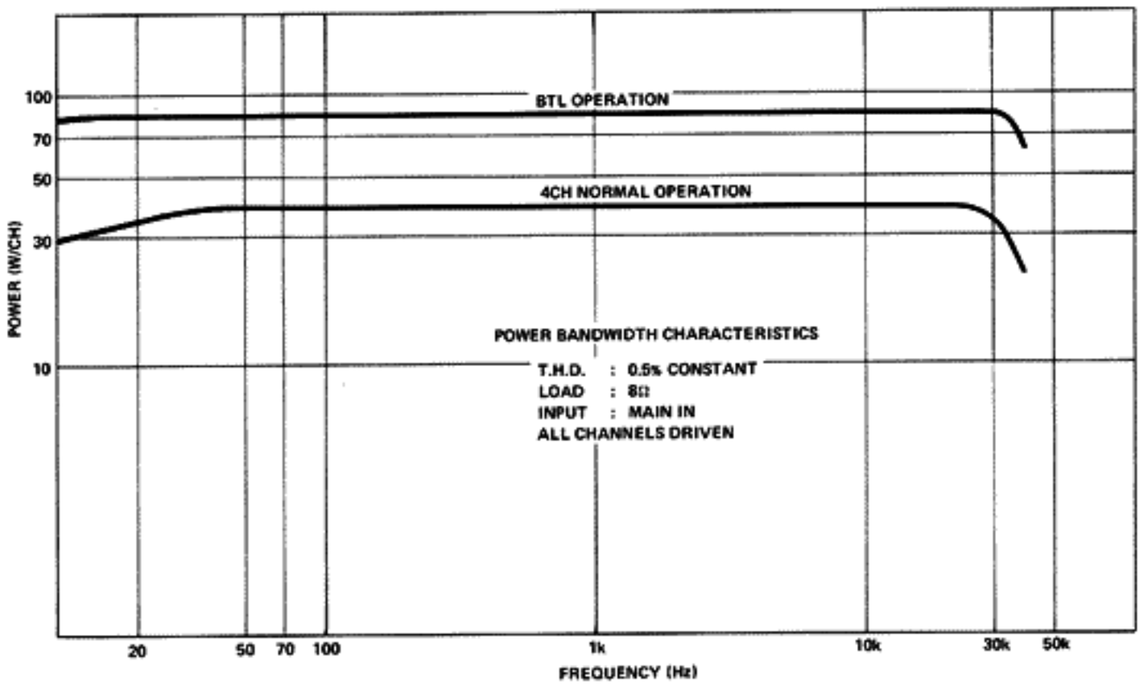
NOTE: Before replacing the fuse switch OFF the amplifier and remove the power cord from the wall outlet.

PERFORMANCE GRAPHS

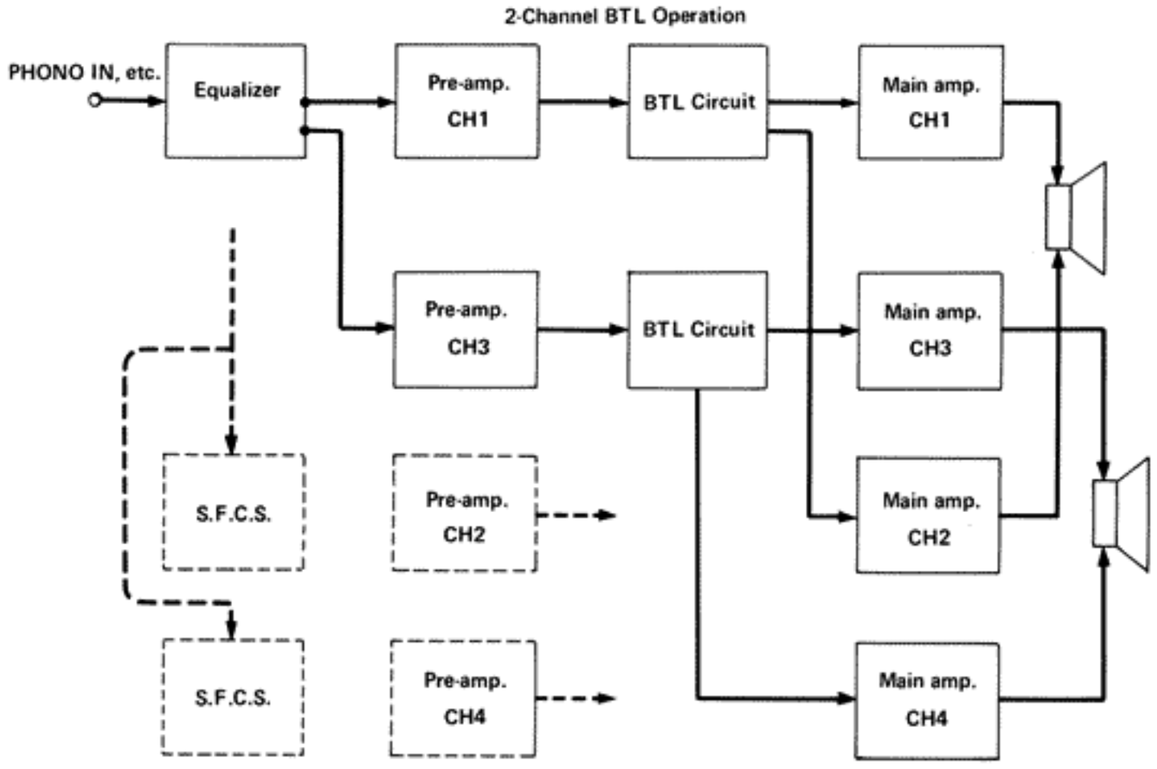




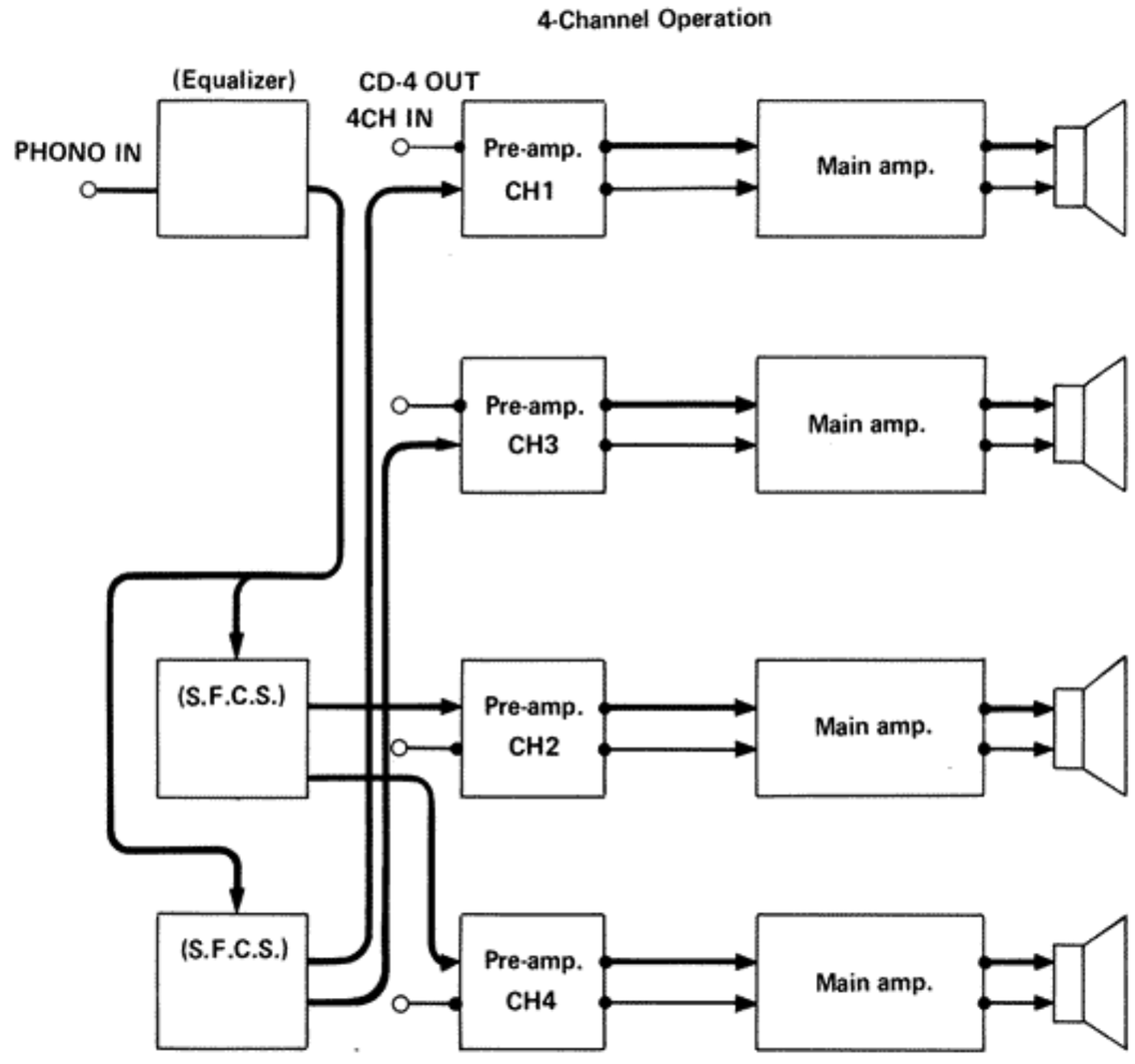




BLOCK DIAGRAMS



SPEAKER LOAD 8 – 16Ω



S.F.C.S. CIRCUIT BLOCK (2CH SOURCE)

DISCRETE CIRCUIT BLOCK
(4CH TAPE, CD-4 RECORD)

SPECIFICATIONS

Type	:	4-Channel Integrated Amplifier
Power source	:	AC 120V, 50/60Hz
Power consumption	:	310W
Dimensions	:	5-3/8" (H) x 16-5/8" (W) x 15-3/8" (D)
Weight	:	35.2 lbs.

POWER AMPLIFIER SECTION

Circuit	:	Direct coupled OCL pure complementary circuit
Total dynamic power (IHF)		
4-channel normal	:	280W (70W x 4) at 4Ω
		264W (66W x 4) at 8Ω
BTL connection	:	310W (155W x 2)
Continuous power (RMS)		
All channels driven	:	152W (38W x 4) at 4Ω
		140W (35W x 4) at 8Ω
BTL all channels driven	:	176W (88W x 2) at 8Ω
Total harmonic distortion	:	0.5% at rated power
Intermodulation distortion	:	0.8% at rated power
Power bandwidth	:	10 – 30,000Hz (IHF)
Frequency response	:	10 – 50,000Hz (±1dB)
Input sensitivity	:	0.7V
Input impedance	:	50kΩ
Load impedance	:	4 – 16Ω (BTL 8 – 16Ω)
Damping factor	:	50 at 8Ω

PREAMPLIFIER SECTION

Circuit	:	3-stage direct coupled equalizer	
Total harmonic distortion	:	0.03%	
Frequency response	:	10 – 50,000Hz (±1dB)	
S/N ratio	:	PHONO (mag. 1)	65dB
		PHONO (mag. 2)	65dB
		AUX-1	75dB
		AUX-2	75dB
		TAPE PLAY	75dB

Input sensitivity for rated power	:	PHONO (mag. 1)	2.5mV
		PHONO (mag. 2)	2.5mV
		AUX (2-ch.)	150mV
		AUX (4-ch.)	150mV
		TAPE MON (Pin–2-ch.)	150mV
		TAPE MON (DIN–2-ch.)	250mV
		TAPE MON (Pin–4-ch.)	150mV
Recording output	:	TAPE REC (Pin–2-ch.)	200mV
		(DIN–2-ch.)	30mV
		(Pin–4-ch.)	200mV

S.E.A. center frequencies	:	40Hz, 250Hz, 1kHz, 5kHz, 15kHz
S.E.A. control range	:	±12dB
Loudness control	:	+12dB at 50Hz
		+6dB at 10kHz
Low cut filter	:	–3dB at 50Hz (12dB/oct.)
High cut filter	:	–3dB at 7kHz (12dB/oct.)
Crosstalk	:	50dB at 1kHz

TROUBLESHOOTING CHART

General

Indication	Cause	Correction
No sound and no illumination even though power is switched on.	Poor connections in AC plug. Blown fuse.	Reconnect plug. Replace fuse. If it blows again the fault must be corrected.
No sound from speakers.	Speaker cords not connected. SPEAKER switches OFF. Volume control at MIN. Remote Control switch ON without Remote control connected.	Check connections at both amp and speakers. Select required speaker systems. Set to required volume. Remote control switch must be off.
Sound missing from any of the speakers.	Speaker cords misconnected. Any of Level controls set to one extreme or the other.	Check connections at both speakers and amp. Adjust level controls.
Noise when AC is switched on or when volume or SEA is adjusted immediately after switching on.	Insufficient warm up.	After switching on you must allow 7 to 8 seconds before adjusting controls.
Intermittent sound.	Operation of protective circuit; indication of short circuit in outp[illegible]	Check speaker cords.

During record playing

Sound missing from any or all of the speakers.	Player output disconnected.	Check signal cords.
Loud hum drowns sound.	Bad player connection.	Check signal cords.
Hum with audible sound.	Signal cords picking up sound from AC cord. Player not grounded.	Choose cord path which minimizes hum. Twist signal cords together. Reverse AC plug connections. Connect player to ground.
Audible sound with buzz.	TV signal picked up by signal cords.	Choose cord path which minimizes buzz.
Howling noise when bass response is boosted or volume is raised.	Feedback from speakers to pickup.	Increase distance between speakers and player.

JVC Makes the World's Finest Home Entertainment Products.

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JVC AMERICA, INC.

50 35 56th Road, Maspeth, N.Y. 11378

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